DOCUMENT RESUME

ED 139 899 UD 017 056

AUTHOR Murnane, Richard J.
TITLE The Impact of Changing Student Enrollment Patterns on the Distribution of Teachers in an Urban School District.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C. Finance and Productivity Group.
PUB DATE [77]
CONTRACT 400-76-0157
NOTE 20p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Enrollment Trends; *Inner City; *Labor Market; Labor Turnover; Low Income Groups; Minority Groups; Statistical Data; Student Characteristics; Surveys; *Teacher Education; Teacher Promotion; *Teacher Supply and Demand; *Urban Schools

ABSTRACT

This nationwide study evaluates the impact of minority student enrollment trends on the composition and distribution of the teaching staffs of inner city school systems. The report summarizes past research on teacher mobility. It outlines recent changes in labor market conditions for teachers and describes the changing characteristics of the students attending urban schools. It also discusses the impact of changing student enrollment patterns on the distribution of teachers within one large urban school district and provides a summary and a discussion of equity and cost implications. The case of Midcity, a large Midwestern city, is used to illustrate trends cited. The report concluded that staffing patterns of inner city schools indicates that the number of teachers employed by the public school system has declined. The average experience level of inner city teachers has increased. In schools with the fewest poor children, the percentage of inexperienced teachers declined. In contrast, in schools with the most poor children, the percentage of inexperienced teachers increased. Tables with data from Midcity support the conclusions of the study. (Author/JP)

The Impact of Changing Student Enrollment Patterns On the Distribution of Teachers in an Urban School District

Richard J. Murnane

Economics Department
University of Pennsylvania
Philadelphia, Pa. 19104

and

Mathematic Policy Research
P. O. Box 2392
Princeton, N.J. 08540

The author would like to acknowledge the excellent research assistance of Alicia Scott and Patrick J. Murnane, and the invaluable cooperation of "Midcity" school officials.

This research was supported by the Finance and Productivity Group of the National Institute of Education under Contract No. 400-76-0157. It does not, however, necessarily reflect the views of that agency.

Introduction

Enrollments in urban school systems in the United States have changed in two dramatic ways in recent years. First, the number of students has declined rapidly. Second, the proportion of minority group students and students from poor families has increased. The purpose of this paper is to discuss the impact of these changes on the composition and distribution of the teaching staffs of urban school systems. This discussion is divided into five sections. Section 1 summarizes past research on teacher mobility. Section 2 outlines recent changes in labor market conditions for teachers. Section 3 describes the changing characteristics of the students attending urban schools. Section 4 discusses the impact of changing student enrollment patterns on the distribution of teachers within one large urban school district. Section 5 provides a summary and a discussion of equity and cost implications.

Past Research

The mobility of teachers has interested social scientists for many years. One reason for this interest is that a change of job location has been the primary mechanism by which teachers could improve their positions. A more important reason, however, is that job mobility has influenced the distribution of teachers, and consequently, the quality of education that different children receive. Children attending schools which teachers found attractive have been taught primarily by a stable group of experienced teachers. Children attending schools that teachers have not found attractive have tended to encounter inexperienced teachers who were waiting for an opportunity to change their job location (7). If teaching experience is positively related to effectiveness, as some

research suggests (6) or if the learning environment of a school is harmed by a high rate of teacher turnover, then children who attended schools less attractive to teachers received inferior educations.

In the past, researchers found that the children attending inner city schools were most likely to be left with inexperienced teachers as a result of teacher mobility. In 1952 Becker reported that most teachers in Chicago were initially assigned to inner city schools. Once they acquired sufficient seniority, they transferred to schools serving middle-class children (2). Greenberg and McCall, studying the San Diego school system, supported Becker's findings. These authors determined that mobility from inner city schools to outlying schools was five times greater than mobility in the opposite direction (4). Harnischfeger reported that the transfer rate of teachers from schools in the San Jose, California, school district was positively related to the percentage of minority students in the school (5). Owen, using data from the 1966 Coleman Report, found that children attending inner city schools were taught by less experienced teachers than children attending other schools in the same school districts (7).

The explanation put forth to explain the unequal distribution of teaching experience is that the pattern reflected the preferences of teachers, subject to the constraint that transfer rights were based on seniority. Most teachers wanted to teach in schools attended by middle-class children. Thus, they transferred to such schools as soon as they acquired sufficient seniority, leaving the vacancies in inner city schools to be filled by new teachers.

The models which have been used to study teacher mobility in the 1960's have implicitly assumed that teachers face a wide variety of alternative employment possibilities in other schools. Until quite recently, this assumption was not unreasonable as a description of teacher labor markets.

In the 1960's, the existence of a teacher shortage meant that there were ample opportunities for teachers unhappy with their current positions to transfer to a different school. However, dramatic changes in labor market conditions for teachers have altered this situation. Increasingly, there are severe limitations on the alternatives available to dissatisfied teachers. These changes in opportunities for teachers are described in the next section.

Changes in Labor Market Conditions for Teachers

Conditions in United States labor markets for teachers have changed in the last ten years from a state of excess demand to one of excess supply. This change is due primarily to altered demographic patterns. The demand for teachers has decreased as a result of a decline in the birth rate. The number of children attending public elementary schools in the United States peaked in 1969 at 32.6 million and decreased to 30.7 million by 1974 (8, p. 12). That this trend will continue for some time is suggested by the fact that the number of six year olds, the age group which enters the first grade, has decreased from 4.0 million in 1969 to 3.4 million in 1974 (8, p. 7). During the same period, the children of the post-war baby boom completed their college education, thus increasing the number of teachers entering the labor market. 209 thousand students graduated from U.S. colleges with Bachelor's Degrees in Education in 1974 compared to 111 thousand in 1964 (9, p. 758).

The demand for teachers in urban school districts has been affected, not only by changes in the birth rate, but also by the decline of central cities. A long term trend in the United States for middle class families to move from central cities to the suburbs in order to acquire more living space has been supplemented by an exodus of families concerned with the

poor quality of urban public education and other aspects of urban life. Other urban families have responded to the educational quality dilemma by sending their children to private schools. Both of these responses have reduced the number of children attending urban public schools.

This trend can be seen by examining elementary school enrollment statistics for the largest urban school districts in the United States. During the years from 1968-73, elementary school enrollments in the twenty largest school districts decreased by 16.9 percent (3), in comparison to a national decline of 2.8 percent (8, p. 12). In nine of the twenty largest districts, the enrollment decline exceeded twenty percent.

This decline in student enrollments has led to a decline in the demand for public school teachers in central city school districts. In many schools declining enrollments have necessitated reductions in teaching staffs. This has created difficult policy questions. Which teachers should be declared surplus when declining enrollment in a particular school mandates a reduction in teaching staff? What options should be given to the surplus teachers? Which teachers should be dismissed if layoffs are necessary?

School district officials and teacher organizations often have conflicting ideas on how the disequilibrium should be resolved. District officials are anxious to retain flexibility in making staff assignments. They would like to be able to reassign teachers as enrollments shift and to support the staffing recommendations of school administrators. Many personnel supervisors would also like to use the excess supply situation to upgrade personnel. Teachers, on the other hand, facing an unattractive job market, are concerned with job security. They are anxious to introduce contract provisions which guarantee the positions of existing

staff. If transfers are unavoidable, they would like the affected teachers to have the maximum amount of discretion in choosing alternative positions. At all costs they would like to avoid layoffs. The type of contract provisions that evolve to deal with the disequilibrium reflect to a large extent the relative bargaining power and bargaining skill of district officials and teacher organizations.

The relevance of these considerations for our analysis is that constraints on the supply of jobs, and the institutional rules which govern the allocation of scarce teaching positions are playing an increasingly critical role in influencing the distribution of teachers.

The Changing Characteristics of Urban Students

Concurrent with the decline in student enrollments, the characteristics of students attending urban schools are changing. As a result of the flight of white middle class families from the cities, the students in central city schools increasingly are minority group children from poor families. Past research suggests that most teachers would prefer to teach in schools serving middle class children. The changing nature of the student clientele means that a growing number of teachers may wish to move to a decreasing number of schools serving middle class children.

Thus we see that there are two major dynamic factors influencing the distribution of teachers in urban school systems. The changing characteristics of students increase the demand for voluntary transfers. The declining enrollments decrease the supply of positions and increase the need for involuntary transfers. It is difficult to predict a priori how the interaction of these forces will influence the composition of urban teaching staffs and the distribution of teachers among schools serving different types of children. It is clear, however, that to

understand the system, we must model both of these dynamic influences. We are currently working on such a model.

In the last section of this paper we describe recent trends in the staffing pattern of one large Midwestern city, which we call Midcity. In future work we plan to use longitudinal data describing the staffing patterns of the Midcity schools to gain insights into the causal structure determining the distribution of teachers.

The Case of Midcity

In the years from 1968 to 1975 the number of children attending public schools in Midcity declined from 48,252 to 40,143. During this same period the composition of the student clientele served by Midcity's schools also changed, reflecting the flight of middle class families from the city. The percentage of students classified as indigent increased from 14 percent to 34 percent. The percentage of black students increased from 60 percent to 74 percent. These trends are illustrated in Table 1.

The rapidly declining student enrollments have affected the Midcity teaching staff in many ways. Clearly the most striking trend is the reduction in the number of teaching positions. The Midcity teaching staff has declined from a high of 1,999 teachers in 1968 to 1,665 teachers in 1975. This reduction in the number of teachers has been roughly proportional to the reduction in the number of students. As a result, the student-teacher ratio has remained quite stable over this period.

The changing student enrollment patterns have also altered the composition of the teaching staff. The most striking trend is the increase in the experience of Midcity's teachers. As indicated in Table 2, only 21 percent of Midcity's teachers had been in the system

TABLE 1

TRENDS IN THE ENROLLMENT AND STAFFING OF MIDCITY SCHOOLS

School-Year	Total Student Enrollment	Percent Black Students	Percent Indigent Students	Total Number of Teachers	Percent Black Teachers	Average Student-Teacher Ratio
64	45652	55.44%	12.06%	1705	53.15%	26.78
65	47357	56.60%	12.01%	1779	53.16%	26.62
66	47385	58.09%	11.86%	1852	53.65%	25.59
67	48162	59.35%	11.77%	1899	55.40%	25.37
68	48252	60.08%	13.95%	1999	53.95%	24.14
69	48165	61.60%	16.13%	1989	58.28%	24.22
70	47528	62.85%	17.96%	1915	59.12%	24.80
71	46401	64.74%	22.56%	1979	58.87%	23.45
72	45300	67.50%	27.38%	1821	61.12%	24.88
73	43781	69.87%	32.21%	1736	61.35%	25.22
74	42324	72.57%	33.31%	1690	63.00%	25.04
75	40143	73.70%	33.77%	1665	63.44%	24.11

TABLE 2

STATISTICS DESCRIBING THE DISTRIBUTION OF EXPERIENCE OF MIDCITY TEACHERS IN THE YEARS 1966-75[1/]

School Year	Years of Experience 1 year	3 or Less	5 or Less
66	15.0	-	-
67	13.8	-	-
68	14.1	34.0	-
69	15.1	33.0	-
70	14.8	33.5	47.1
71	14.3	34.8	47.5
72	6.7	28.1	42.1
73	10.2	25.3	40.4
74	10.8	22.3	37.6
75	7.4	21.4	33.0

[1/] Each entry states the percentage of teachers in the system in that year in a particular experience category. (First year teachers are considered to have one year of experience.)

for less than four years in 1975, compared to 34 percent in 1968. The comparable figures for first year teachers are 7 percent and 14 percent. This trend is the result of the declining number of new teachers entering the system each year. In 1968, 256 new teachers were hired: in 1975, the number was only 116.

In other school systems, a declining attrition rate among teachers has contributed to the increase in the average experience level of the teaching staff (1). As indicated in Table 3, no such trend is present for teachers in Midcity. In fact, the attrition rate for first year teachers increased from 27 percent in 1968 to 35 percent in 1974. Had this not occurred, even fewer new teachers would have been hired in recent years.

One important question that should be asked is whether the increase in the experience of Midcity's teachers has affected the composition of the teaching staffs in all schools in the same way. In particular, has the experience of the teaching staffs in the schools with the greatest number of poor children increased to the same extent that teacher experience has increased in the schools serving the fewest poor children? To answer this question, we have compared the experience distributions of the staffs of schools serving primarily poor children with the experience distributions of the staffs serving primarily middle class children in three years, 1966, 1970, and 1974. The statistics are presented in Table 4.[1/] In interpreting these statistics, it is important to notice that the definitions of schools serving high

---

[1/] We find it more instructive to compare the staffing patterns of the schools with the highest and lowest percentages of poor students over time, than to examine the staffing of the mean or median schools over time. One reason for this is that we suspect that a "tipping" phenomenon may be important. In other words, the percentage of poor students in a school may matter to teachers only above a certain critical percentage. This nonlinear effect can most easily be observed by examining the staffing patterns of the "extreme" schools.

TABLE 3

ATTRITION RATES FOR FIRST YEAR TEACHERS AND FOR TEACHERS WITH MORE THAN THREE YEARS OF EXPERIENCE IN MIDCITY

(Each entry states the percentage of teachers in the experience group who left the Midcity schools in that year)

School Year	Attrition Rate of First Year Teachers	Attrition Rate of Teachers with More than Three Years of Experience
1966	18.5	
1967	26.1	7.8
1968	27.0	9.3
1969	26.1	9.2
1970	25.1	10.5
1971	25.0	10.5
1972	28.3	11.3
1973	37.1	11.5
1974	34.9	9.4

TABLE 4

STATISTICS DESCRIBING THE EXPERIENCE DISTRIBUTION OF TEACHERS

IN DIFFERENT TYPES OF SCHOOLS IN MIDCITY

Schools Classified by Percentage of Indigent Students (%I)

	1966		1970		1974	
	Low % Indigent (% I≤10)	High % Indigent (20 < %I≤40)	Low % Indigent (% I≤10)	High % Indigent (30 < %I≤50)	Low % Indigent (% I≤20).	High % Indigent (50 < %I≤70)
Total number of teachers working in these schools	988	597	513	407	338	230
Percentage that are first year teachers	16.9	12.7	10.3	12.5	7.4	13.9
Percentage of the teachers that have five or more years of experience			63.7	68.3	81.7	66.1

Elementary Schools Classified by Average Achievement of Students[1/]

	1966		1970		1974	
	Low	High	Low	High	Low	High
Total number of teachers working in these schools	151	212	164	159	158	118
Percentage of first year teachers	5.0	13.7	9.1	10.7	10.8	8.5
Percentage of the teachers that have five or more years of experience			73.2	59.7	37.3	45.8

[1/] Achievement test scores are only available for elementary schools. Low and High achievement refer to the tails of the achievement distribution in that year.

and low percentages of indigent children are different in the three years. These definitional differences are necessary to accommodate the changing characteristics of the Midcity student body. In describing the trends in teacher experience levels, we focus on the probability that children in different types of schools will be taught by first year teachers. We find that this comparison is indicative of overall trends in the experience distributions.

In 1966 schools with the most indigent students had a slightly lower percentage of first year teachers than did schools with the fewest indigent students (13 percent compared to 17 percent). This is surprising in that it conflicts with the patterns described in several earlier studies. We expected to find, as other researchers had, that the schools with the greatest number of poor children also had the greatest number of inexperienced teachers. One explanation for the teacher experience distribution in Midcity in 1966 is that even in the schools with the greatest number of poor children, less than forty percent of the children were classified as indigent. Perhaps these schools were not significantly less attractive to teachers than other schools in Midcity.

By 1970 we begin to observe a trend similar to the pattern observed by other researchers. In schools with the fewest poor children, the percentage of first year teachers had fallen to 10 percent. In the schools with the greatest number of poor children the percentage of first year teachers had remained between 12 and 13 percent. By 1974, only 7 percent of the staffs of schools serving primarily non-indigent children were first year teachers. In comparison, 14 percent of the staffs of schools serving primarily poor children were first year teachers.

Thus we see that the increasing experience distribution of Midcity's teachers has not affected all schools in the same way. In the schools

serving primarily middle class children, the percentage of inexperienced teachers has declined dramatically. In the schools serving the most poor children, there has actually been an increase in the percentage of inexperienced teachers.

When we examine the distribution of teachers serving in the schools with the highest and lowest average student achievement, we find the same pattern. In 1966 the schools with the lowest student achievement had fewer first year teachers than did the schools with the highest student achievement. In the years since 1966, the percentage of first year teachers serving in the schools with high achieving children has fallen, while the percentage of first year teachers working in the schools with low achieving students has risen (see Table 4).

The explanation for the changes in the distribution of Midcity teachers lies in the mobility behavior of the teaching staff. Over the last eight years the transfer rate of teachers in schools serving the greatest number of poor children has increased relative to the transfer rate of teachers in schools serving primarily middle class children. The teacher resignation rate is sensitive in similar ways to the characteristics of the student body, especially for first year teachers. However, the overall pattern for teacher resignations is less clear cut (see Table 5).[2/]

[2/] In Table 5 we have presented separate statistics for the mobility of first year teachers and experienced teachers. The reason for this is to take explicitly into account the fact that the attrition rate of teachers declines as teachers acquire more experience. If all of the experienced teachers were clustered in one type of school and the inexperienced teachers in another type of school, we might attribute differences in aggregate mobility rates to differences among schools that were actually the result of the clustering phenomenon.

We are aware that a multiple regression framework provides a more efficient way to control for the effects of experience. We plan to use this in future work. However, at this time we do not feel sufficiently confident of our understanding of the relationship between experience and attrition to specify the functional form explicitly--which the multiple regression framework requirements.

TABLE 5

STATISTICS DESCRIBING THE MOBILITY BEHAVIOR OF TEACHERS IN DIFFERENT TYPES OF SCHOOLS IN MIDCITY

	Schools Classified by Percentage of Indigent Students (%I)					
	1966		1970		1974	
	Low % Indigent (%I≤10)	High % Indigent (20 < %I≤40)	Low % Indigent (%I≤10)	High % Indigent (30 < %I≤50)	Low % Indigent (%I≤20)	High % Indigent I50<%I≤70)
Percentage of first year Teachers in these schools who: resigned	21.6	13.2	20.8	35.3	28.0	28.1
transferred	2.4	1.2	5.7	11.8	4.0	12.5
Percentage of Teachers in these schools with five or more years of experience who: resigned			10.4	8.6	9.1	7.9
transferred			0.9	6.1	2.5	12.5

(We did not include a table describing the mobility behavior of first year teachers in schools classified by average achievement because the number of observations in most cells was very small.)

The statistics describing the mobility of teachers in different types of schools are informative in that they describe the mechanics by which the distribution of teachers is changing. However, these statistics do not provide insight into the causal structure determing the distribution of Midcity teachers. In other words, they do not address the critical question of why teacher resignation and transfer rates are different in schools serving different types of children. This is a particularly difficult question to address for urban school districts in the 1970's because two dynamic influences are at work. First, the mobility pattern could reflect the reactions of teachers to the changing demographic characteristics of students. Second, the mobility pattern could reflect the influences of declining enrollments and the operation of the institutional rules which govern the allocation of surplus teachers.

The goal of our future research is to determine the impact of both of these influences on the mobility of Midcity's teachers and on the consequent distribution of the teaching staff. Our hope is that if we can model the operation of the institutional rules governing transfers and layoffs (which school officials stress are so important), we can use simulation techniques to explore the impact of alternative institutional rules on the distribution of teachers.

Summary and Implications

Our initial examination of the staffing patterns of Midcity schools over the period from 1966 to 1975 has revealed the following trends:

1. The number of teachers employed by the system has declined steadily.
2. The average experience level of Midcity teachers has increased markedly.

3. The increasing experience of Midcity's teachers has not affected the staffing of all schools in the same way. In the schools with the fewest poor children, the percentage of inexperienced teachers has declined dramatically. In the schools serving the most poor children, the percentage of inexperienced teachers has increased.
4. The attrition rate of first year teachers, which has been greater than 25 percent since 1967, is rising.

The central question to consider in assessing the implications of the changing staffing patterns is what effects do these changes have on the quality of education provided to Midcity children. We cannot provide an unequivocal answer to this question because there is no consensus among researchers concerning the relationship between teacher characteristics and teacher performance. In particular, there is substantial disagreement concerning the relationship between teaching experience and teaching effectiveness. We would nonetheless like to suggest some implications based on our own earlier research. It should be stressed that these must be considered tentative.

In earlier research on the factors affecting the learning of black inner city children, we found that the effectiveness of teachers increased dramatically in the first few years of teaching, reaching a peak in the third to fifth year of teaching. We found no systematic relationship between experience and performance for teachers with more than five years of experience (6). If these relationships hold for Midcity teachers, then the education provided in the schools serving the fewest poor children is improving while the education provided in the schools serving the greatest number of poor children is deteriorating.

The high rate of teacher turnover in schools serving primarily poor children may also have a deleterious effect on the overall instructional program. The reason for this is that teacher turnover may disrupt the planning process. This is particularly plausible given the increasing use of departmentalized teaching programs in Midcity. These programs require more coordination among members of the teaching staff than do programs which use self-contained classes.

One clearcut implication of the recent changes in the staffing pattern of the Midcity schools is that the cost of educating a child in Midcity is increasing. This increase does not even take into consideration the effects of new wage settlements. The reason for this increase is that in Midcity, as in most public school systems, a teacher's salary is tied to the teacher's experience level. Thus, the increase in the averege experience of Midcity's teachers has resulted in an increase in the average teacher's salary. This has resulted in an additional financial burden on a city already troubled by a declining property tax base.

We are currently conducting a study of the determinants of teacher effectiveness in Midcity. We believe that the results of this research in conjunction with our further work on teacher mobility will provide a firm basis for evaluating the factors affecting the quality of education provided to children in urban schools.

BIBLIOGRAPHY

1. Anderson, Barry and Mark, Jonathan. "Staff Mobility in the Public School Systems of Metropolitan St. Louis: 1968-74", mimeo.

2. Becker, Howard S. "The Career of the Chicago Public School Teacher," American Journal of Sociology, Vol. 57 (March 1952).

3. Coleman, James S., Kelly, Sara D., and Moore, John A. Trends in School Segregation, 1968-73, Washington, D.C.: Urban Institute, 1975. (Appendices 3-5 consist of raw data from which the statistics cited in this paper were calculated.)

4. Greenberg, David and McCall, John. Analysis of the Educational Personnel System II: A Theory of Labor Mobility with Applications to the Teacher Market, Santa Monica, Cal.: Rand Corporation, 1973.

5. Harnishfeger, Annegret. "Personal and Institutional Characteristics Affecting Teacher Mobility: IV. Schools Do Make a Difference," Report No. 6, Studies of Educative Processes, Chicago, 1973.

6. Murnane, Richard J. The Impact of School Resources on the Learning of Inner City Children, Cambridge, Mass.: Ballinger Publishing Co., 1975.

7. Owen, John D. "The Distribution of Educational Resources in Large American Cities," Journal of Human Resources, Vol. 7, No. 1 (Winter 1972), pp. 26-38.

8. Standard Education Almanac 1975-76, 8th Edition, Chicago: Marquis Academic Media, 1975.

9. Yearbook of Higher Education 1975-76, 7th Edition, Chicago: Marquis Academic Media, 1975.